Hydrogeology and Critical Aquifer Recharge Areas

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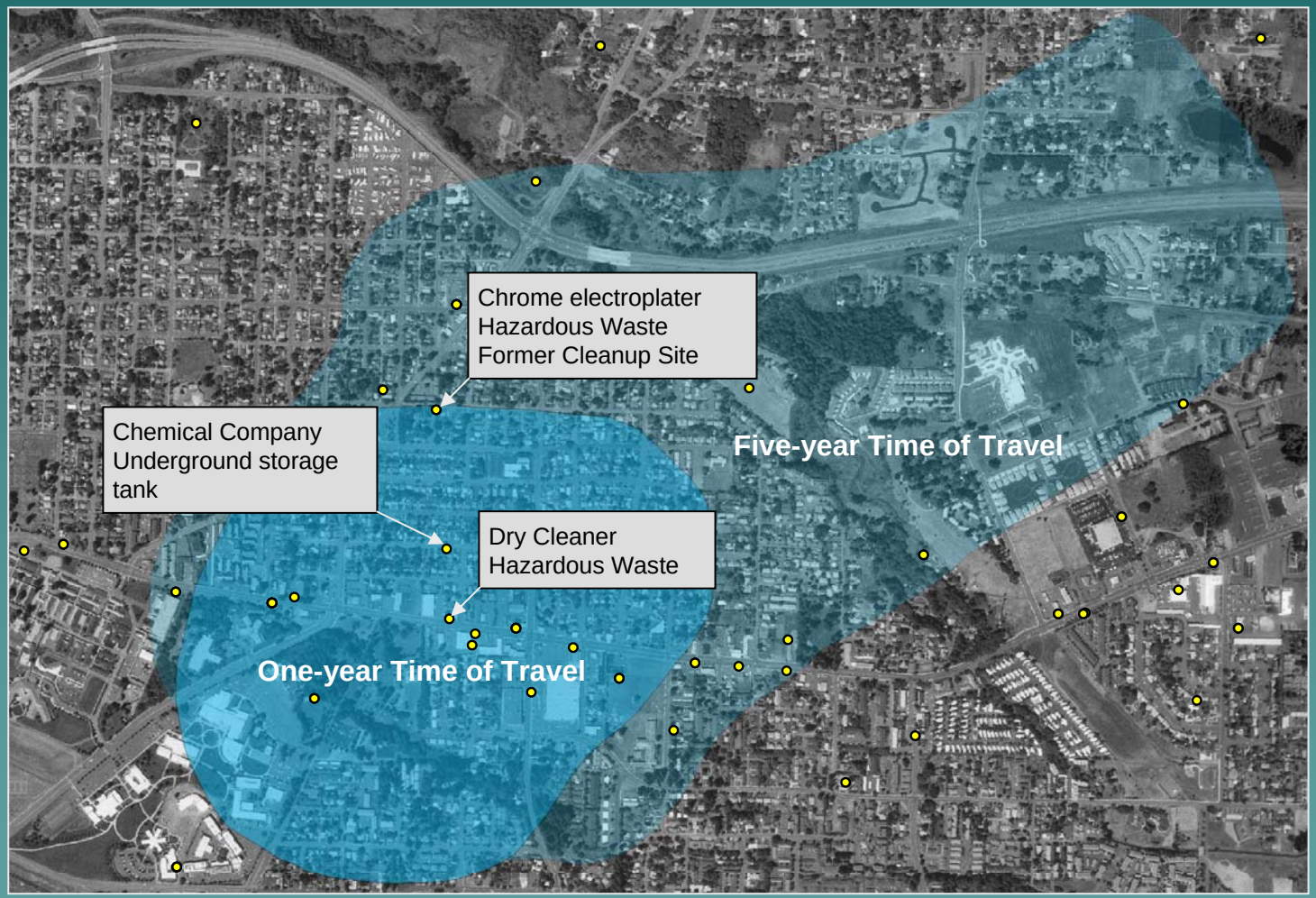
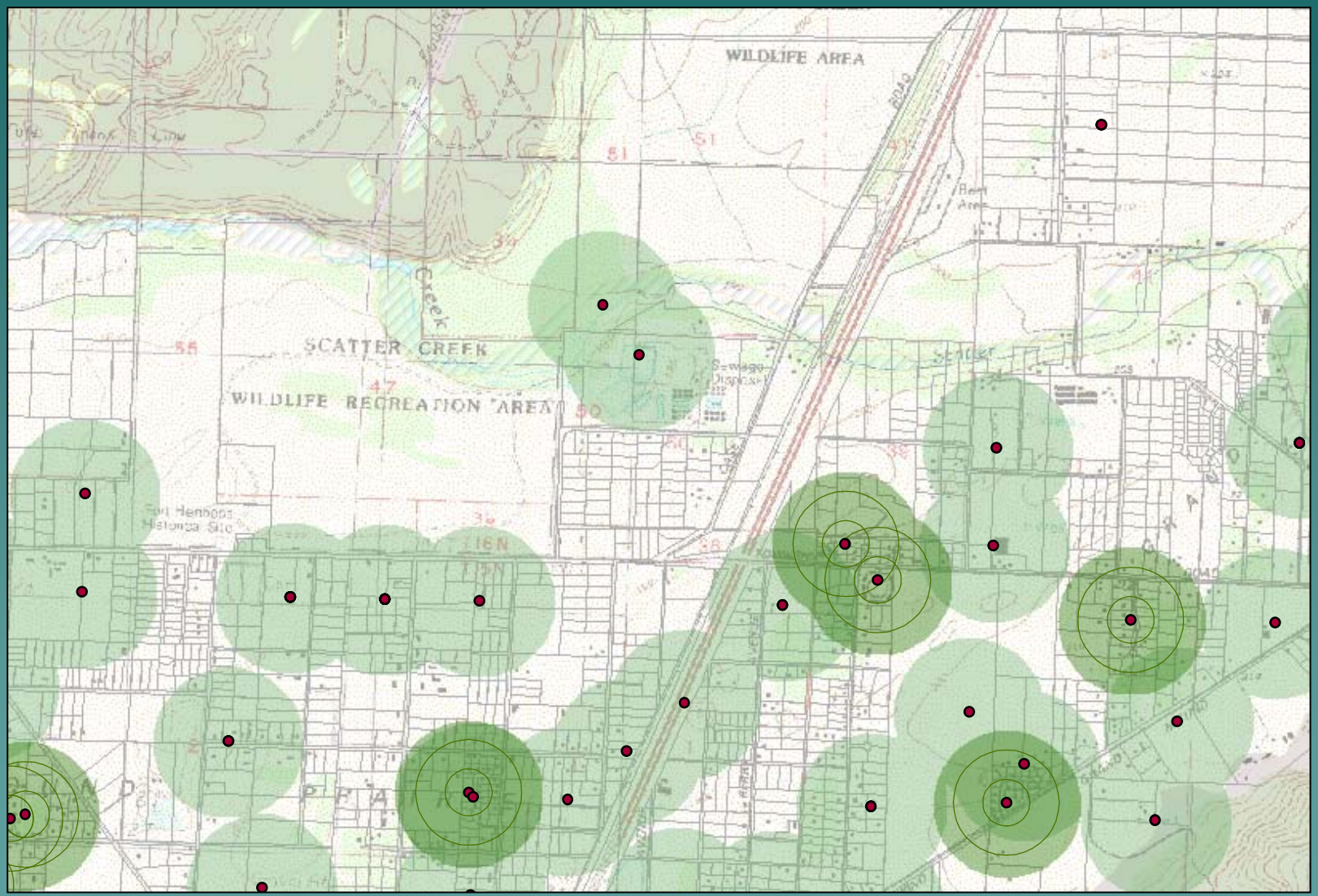
April 12, 2005

5th Washington Hydrogeology Symposium

Well Head Protection Area



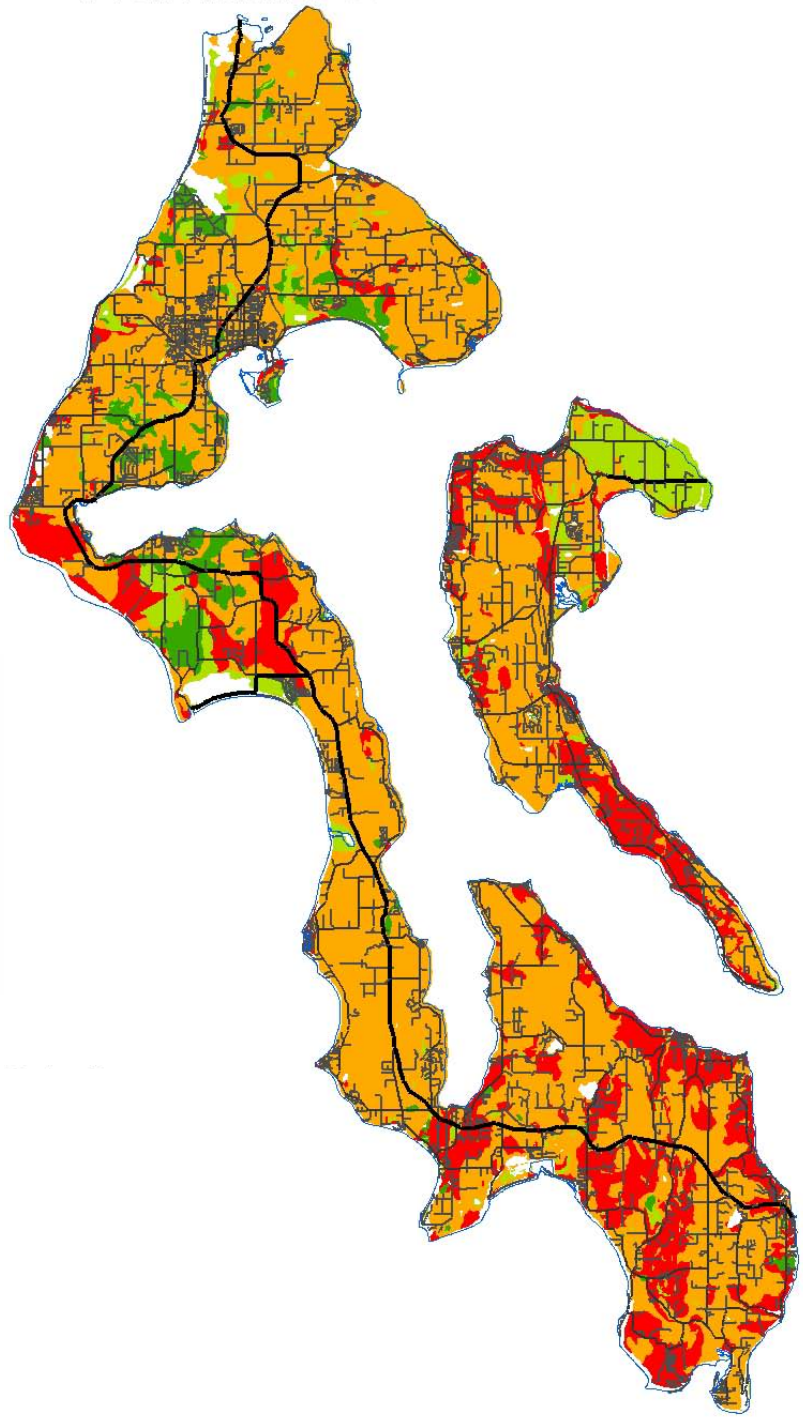
Well Head Protection Areas



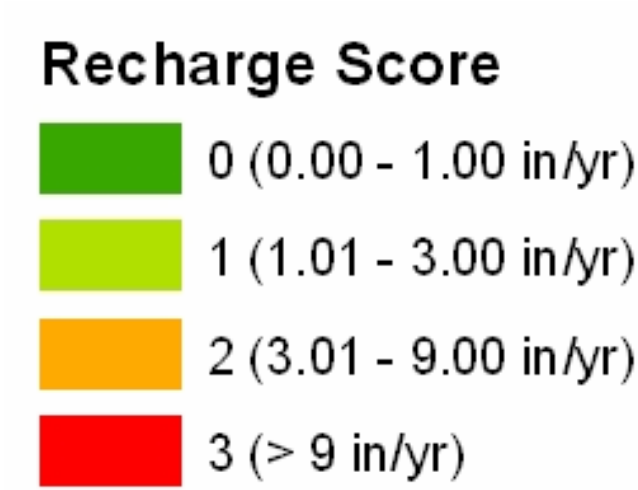
Island County

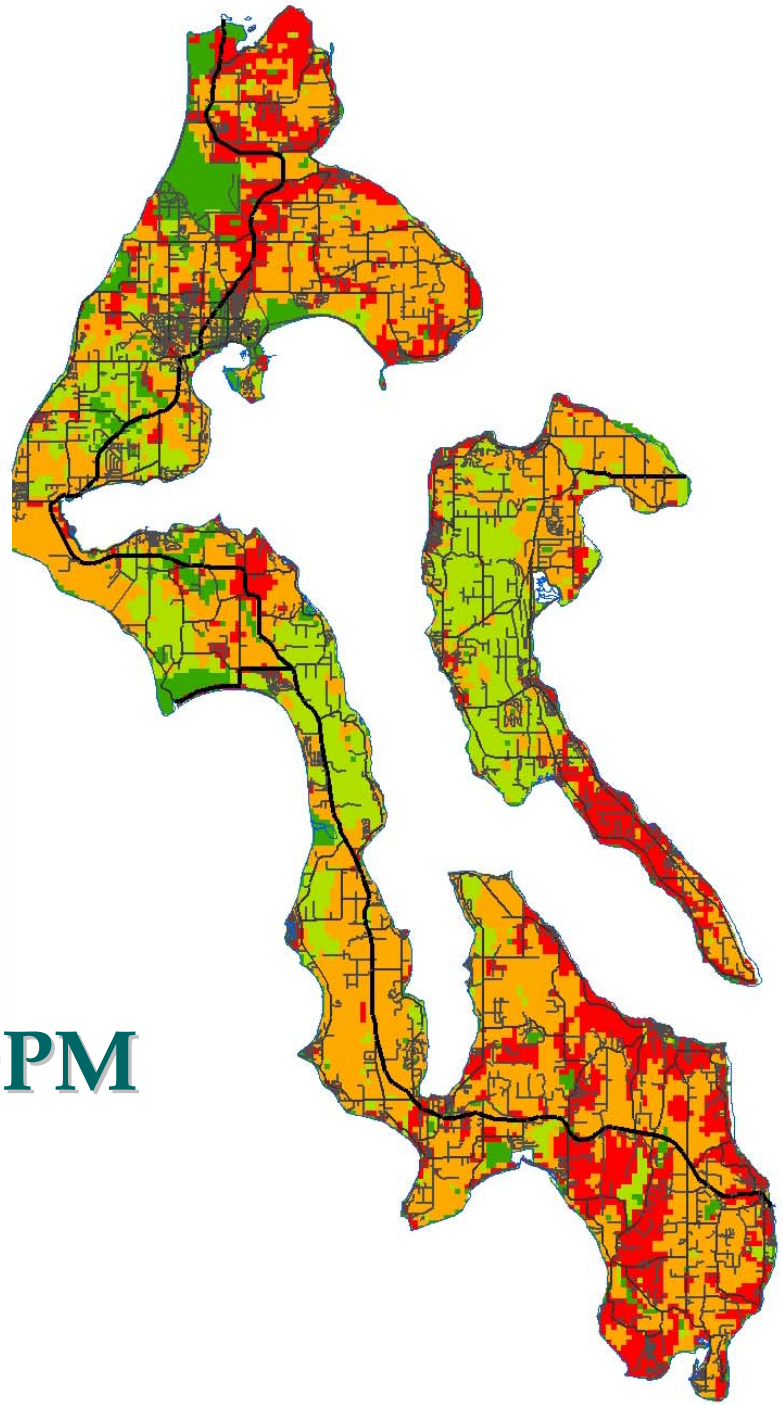
Percolation Rate Score

- 0 (Very Slow <0.06"/hr)
- 1 (Slow to Moderate Slow 0.06-0.6"/hr)
- 2 (Moderate to Moderate Rapid 0.6-6"/hr)
- 3 (Rapid to Very Rapid >6"/hr)



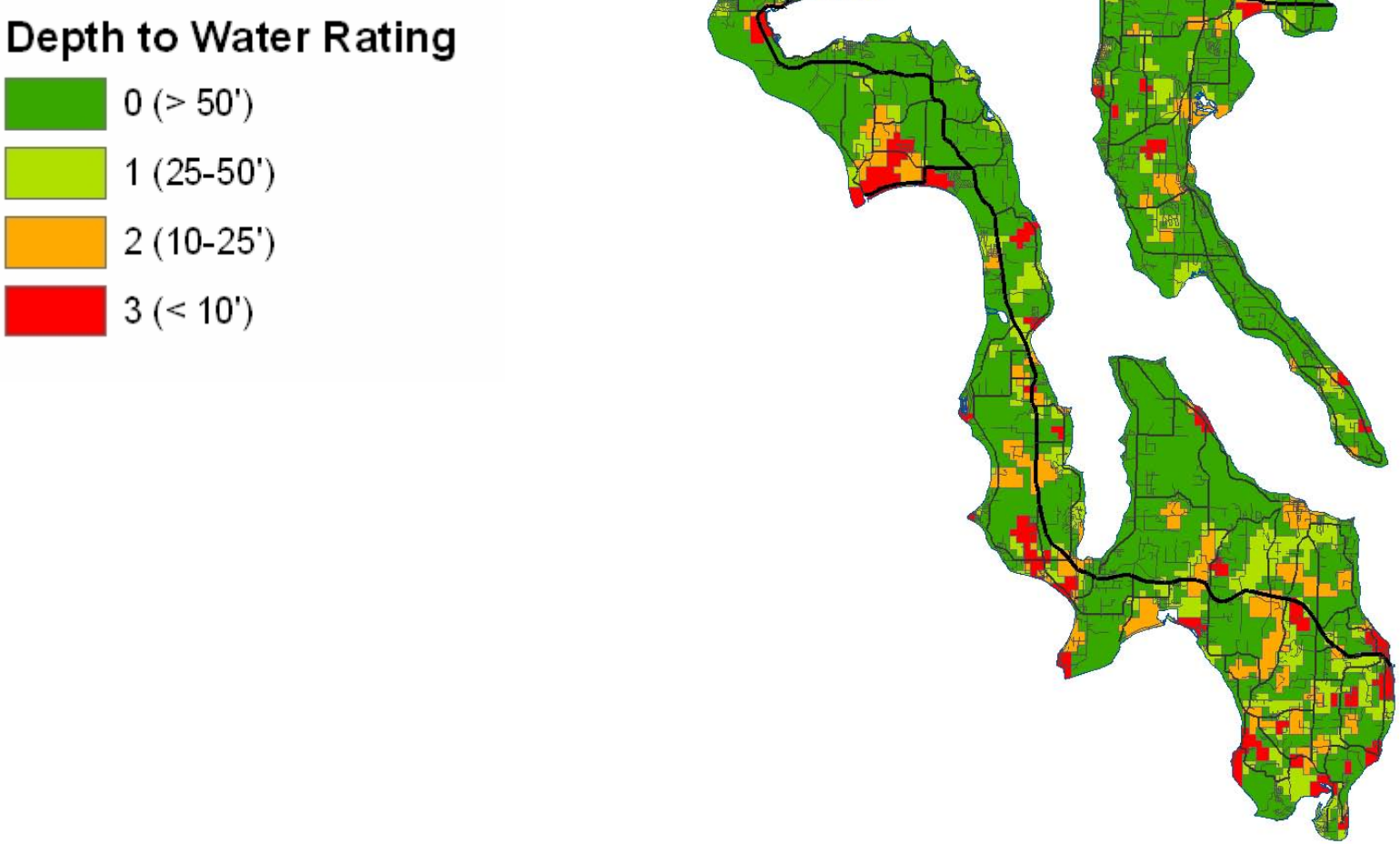
Island County



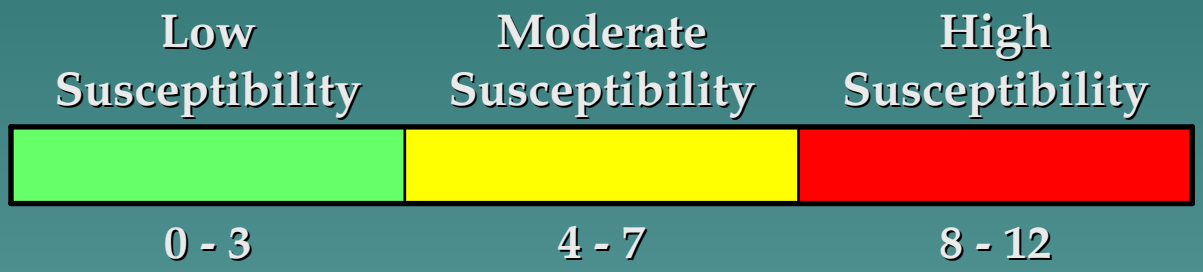


Based on USGS DPM

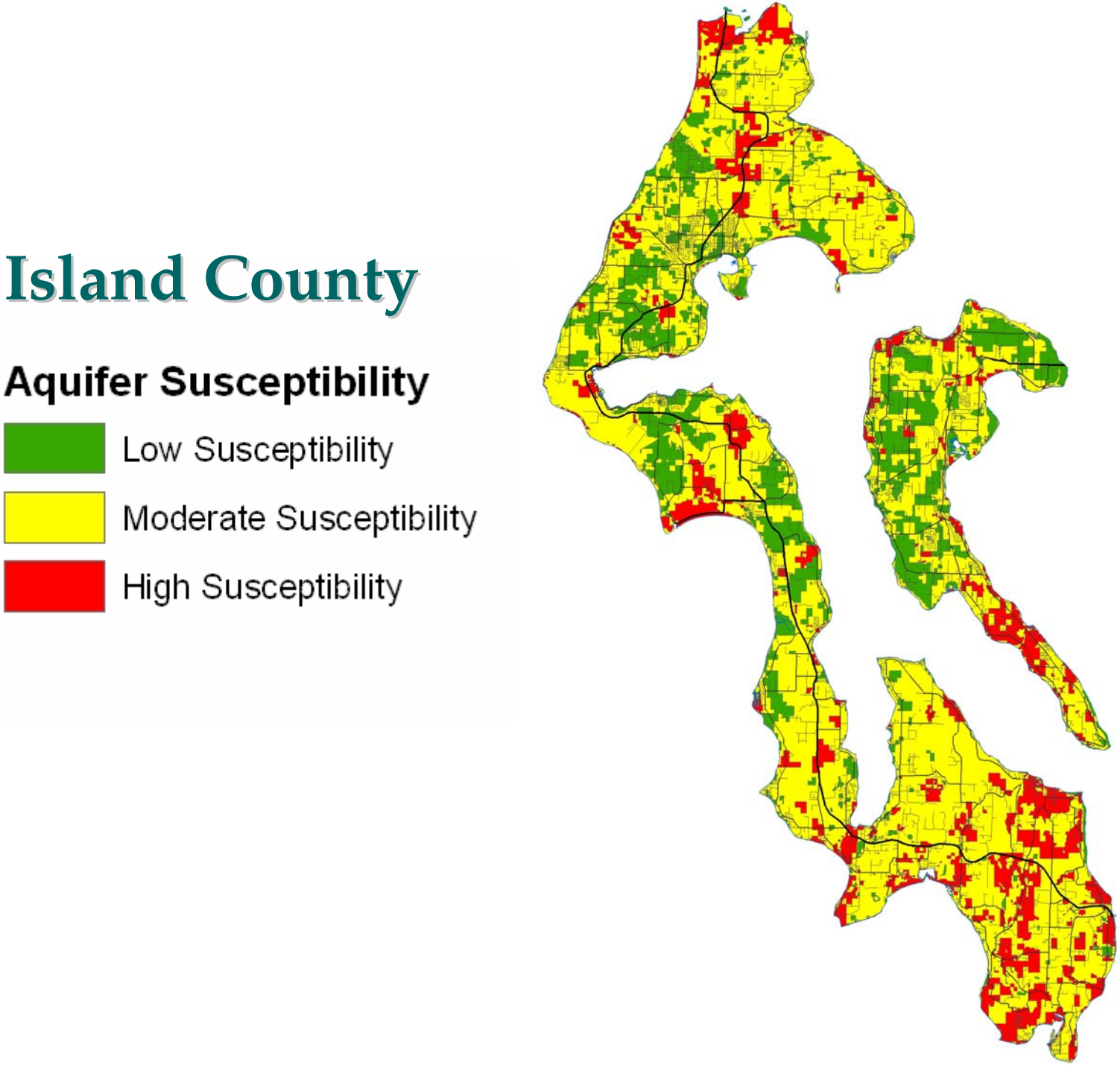
Island County



Add it all up…


Low Susceptibility
Moderate Susceptibility
High Susceptibility
0 - 3
4 - 7
8 - 12

Island County



S H A D I

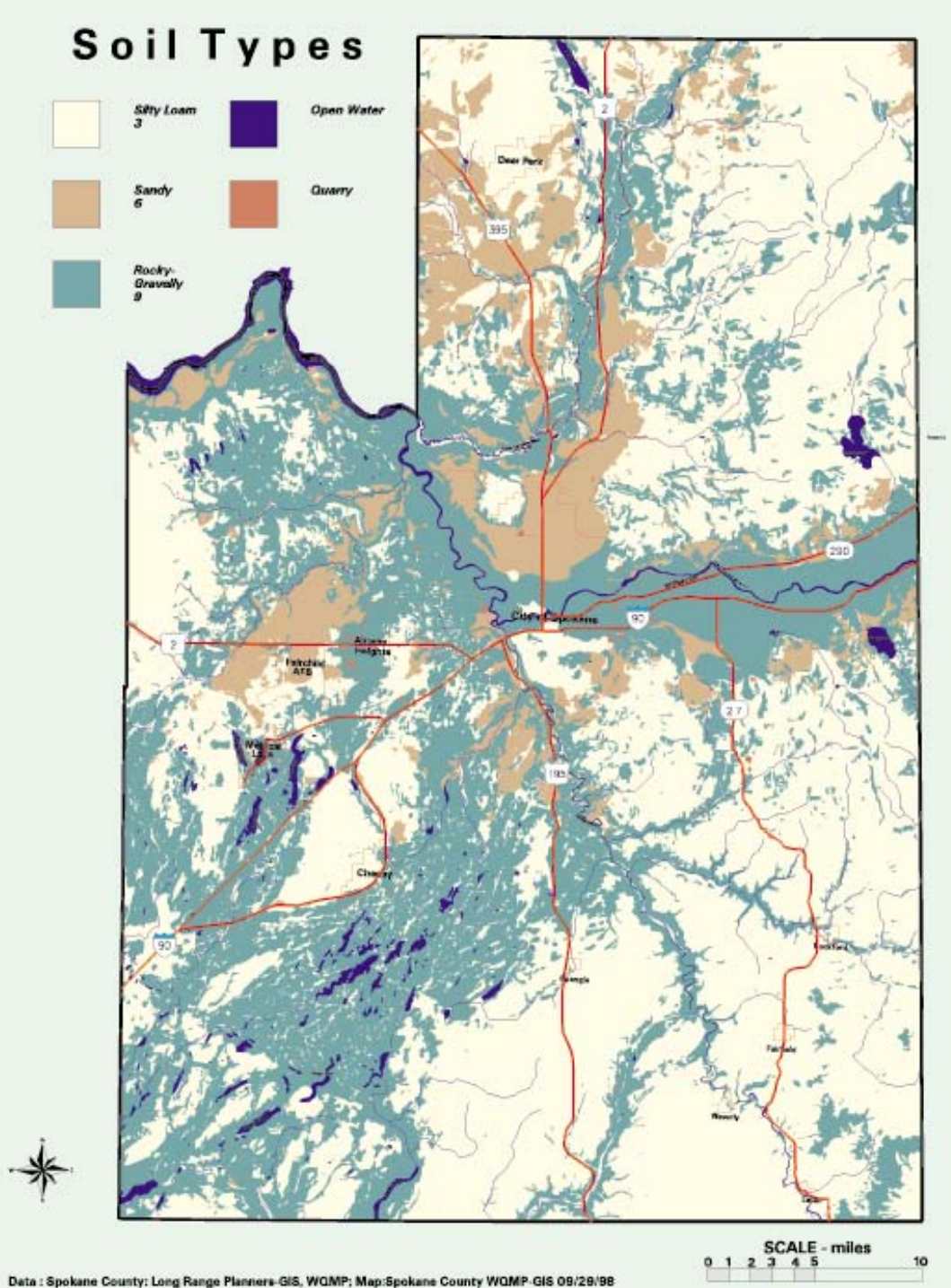
Soil

Hydraulic conductivity

Annual recharge

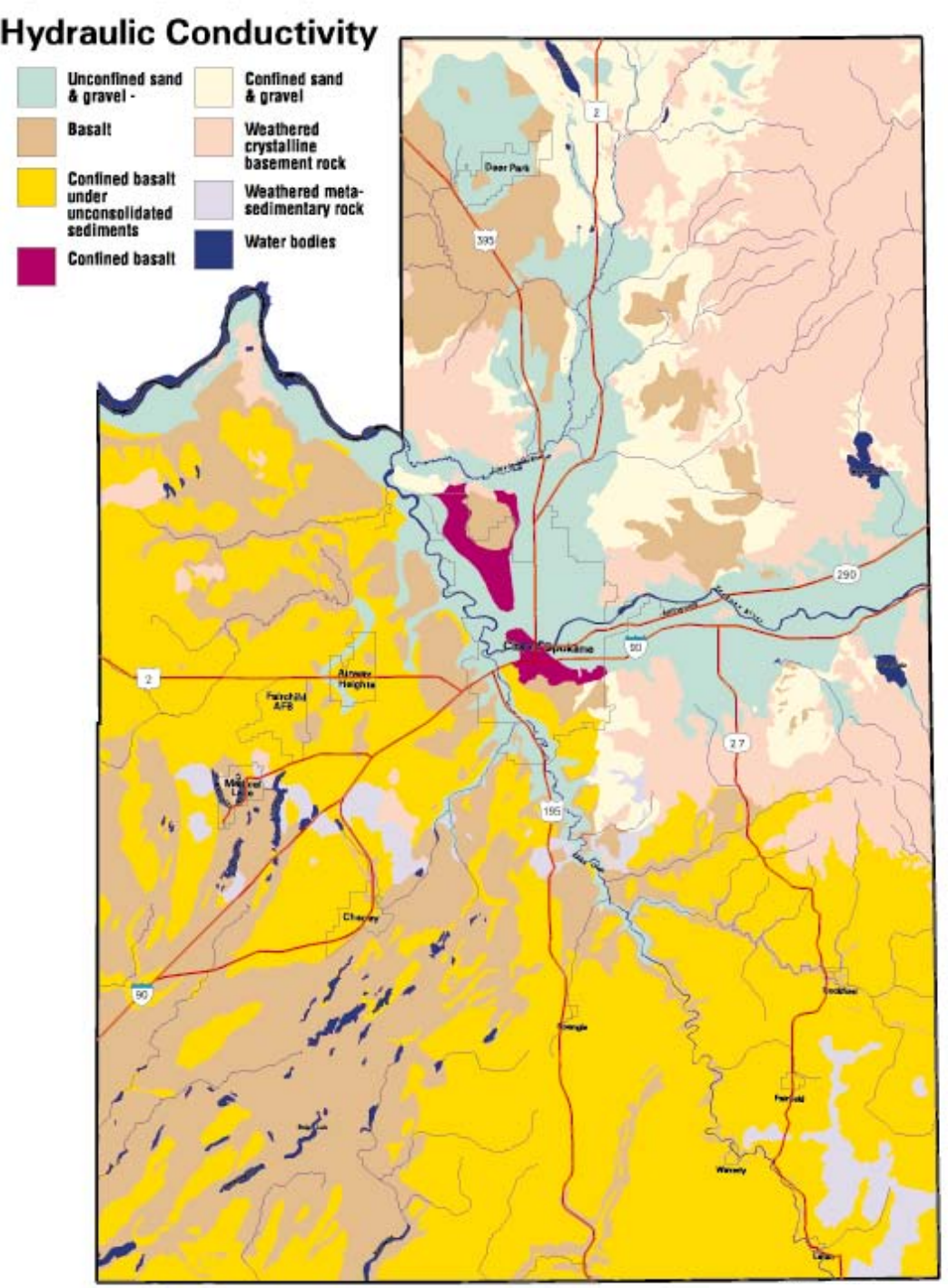
Depth to groundwater

Importance of vadose zone



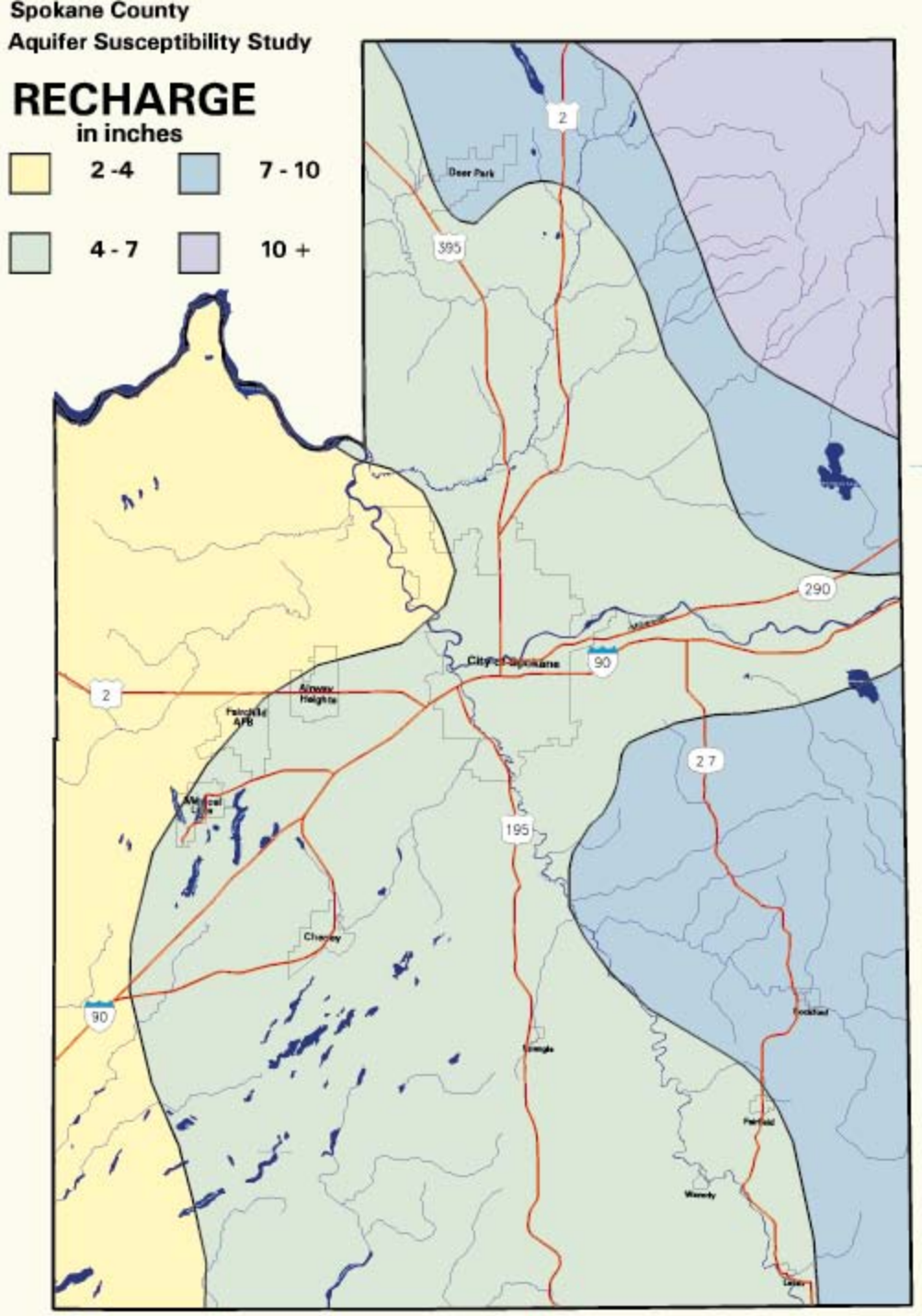
SHADI

Rating	Soil Type
3	Silty Loam
6	Sandy
9	Rocky/Gravel



SHADI

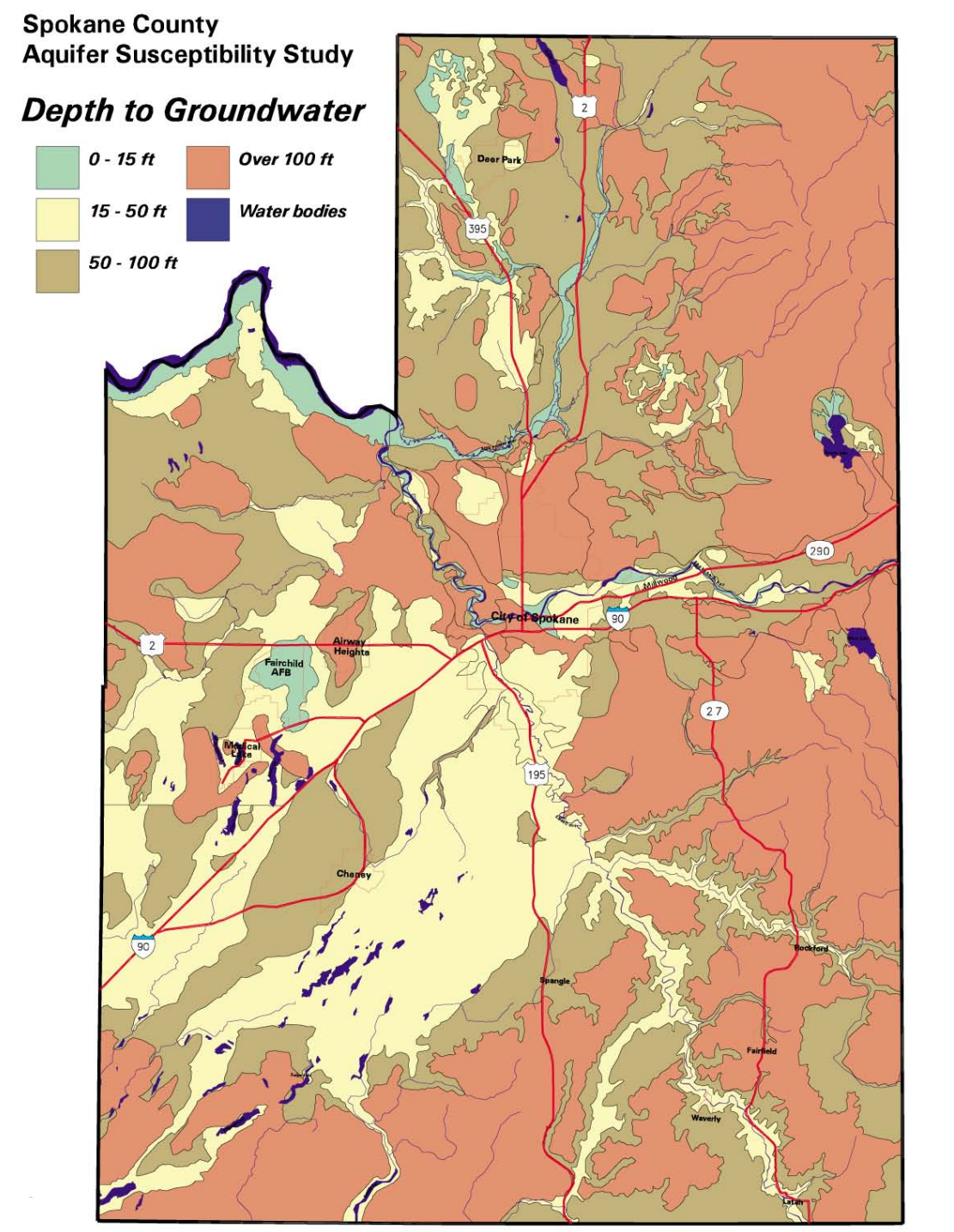
Rating	Geology
10	Sand and gravel, unconfined, Spokane Aquifer
8	Sand and gravel, unconfined, other
4	Basalts, confined
4	Basalts, confined under unconsolidated sediments
4	Weathered crystalline basement (intrusive) rock
2	Weathered meta-sedimentary rock
NA	Basalt



SHADI

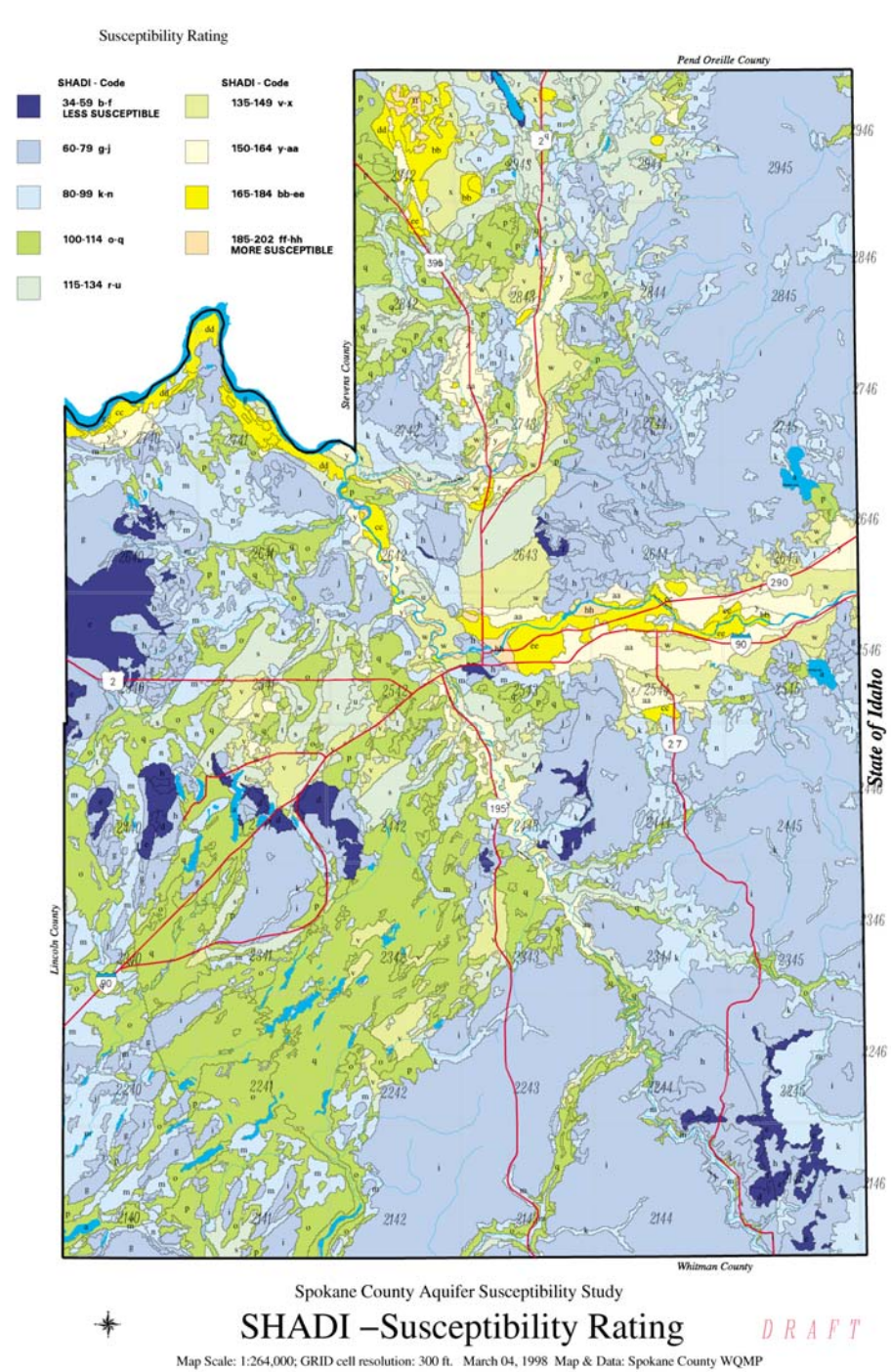
Recharge (inches)
2 - 4
4 - 7
7 – 10
10 +

Where Recharge = (Annual precipitation * 0.67) - 7.25



SHADI

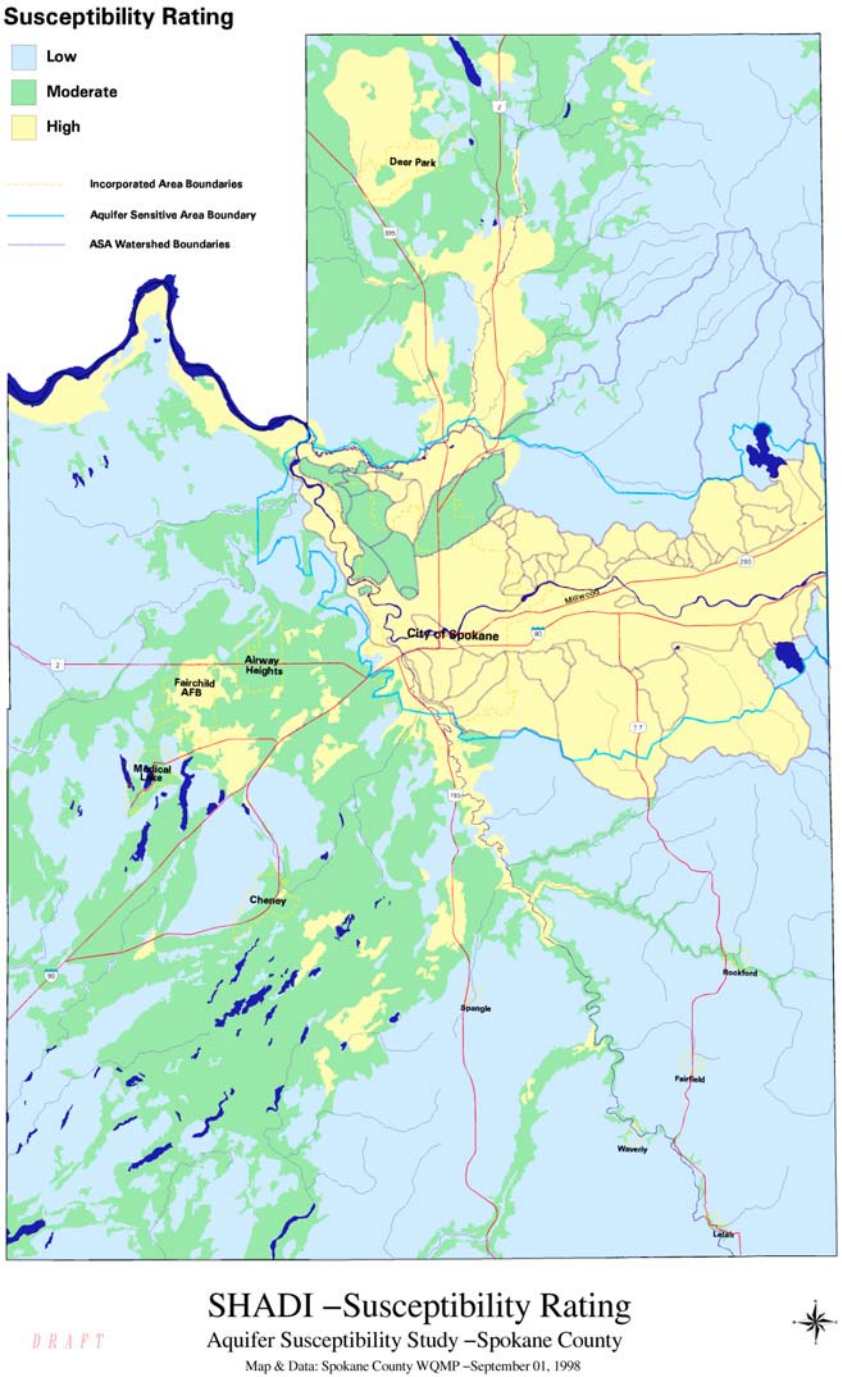
Depth to Water (feet)
0 - 15
15 - 50
50 - 100
> 100



SHADI Formula:
S*2 + H*6 + A*4 + D*I

Susceptibility Rating

- 34 - 59
- 60 - 79
- 80 - 99
- 100 - 114
- 115 - 134
- 135 - 149
- 150 - 154
- 16 5 - 184
- 185 - 202



CARA based on SHADI

Low

Medium

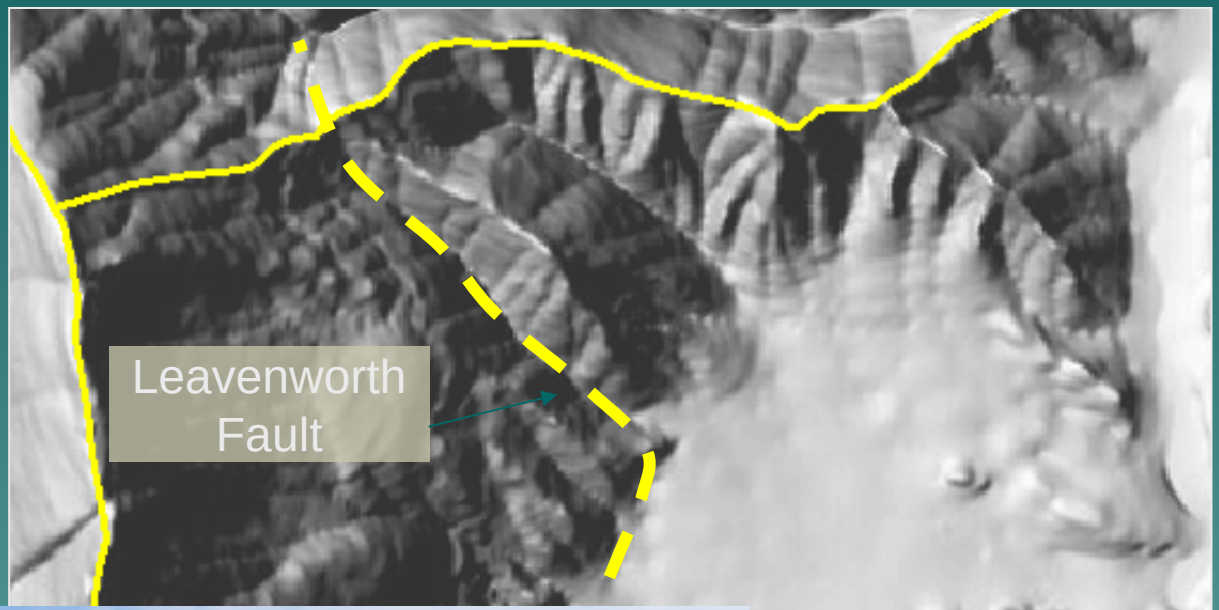
High

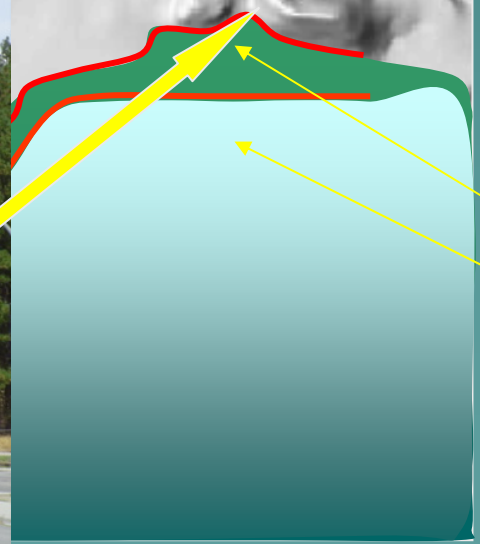
Upper Ski Hill

- Stormwater management
- Flooding
- Recharge
- Habitat
- Wetlands

Alteration of Subsurface Flows

Collect Geologic Information: Identify Faults and Glaciation Pattern



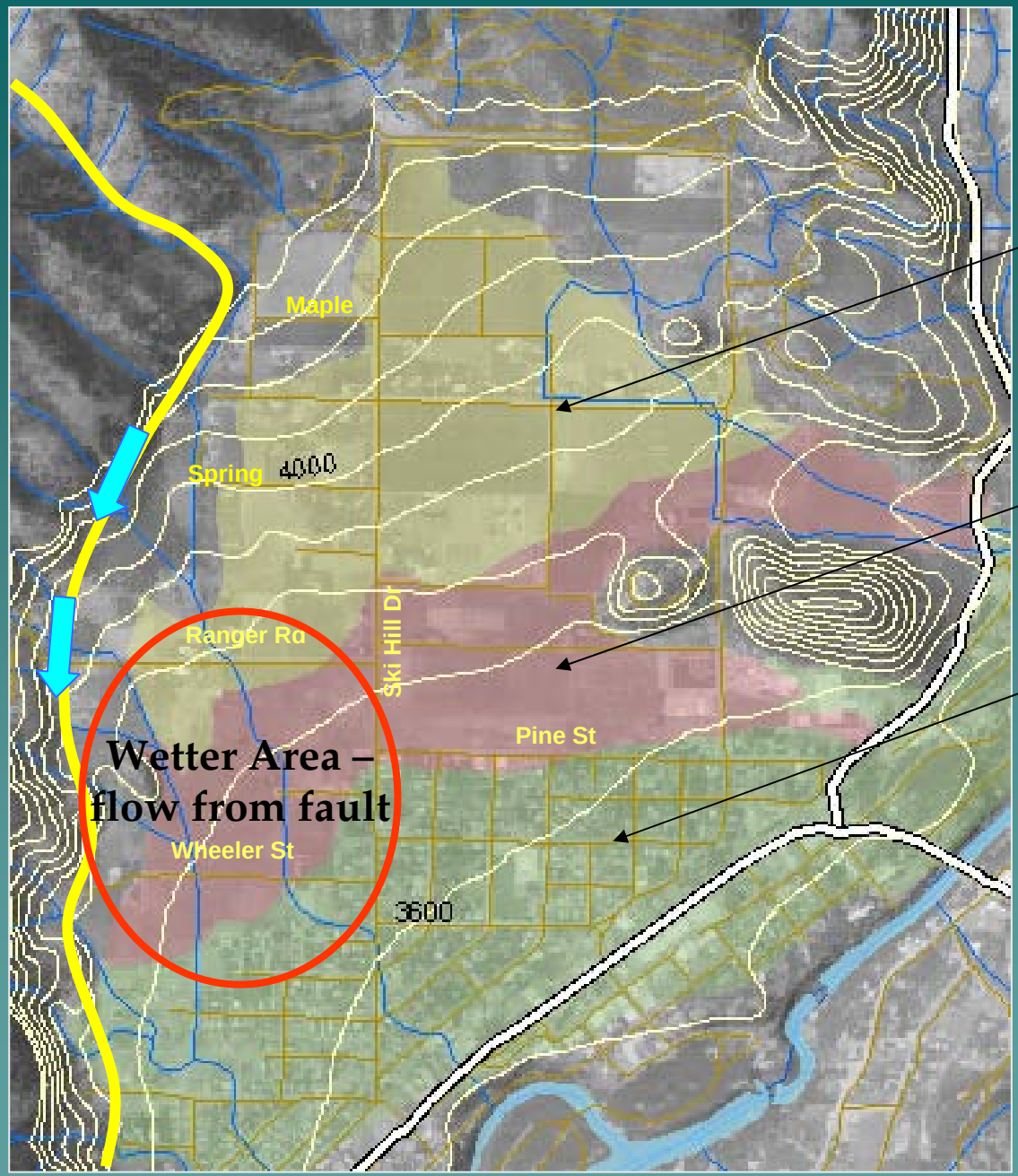


Leavenworth Fault – represents a major shear zone

Glaciers advanced several times from the south into the Ski Hill area and then receded.

Each time they receded they left terminal moraines.

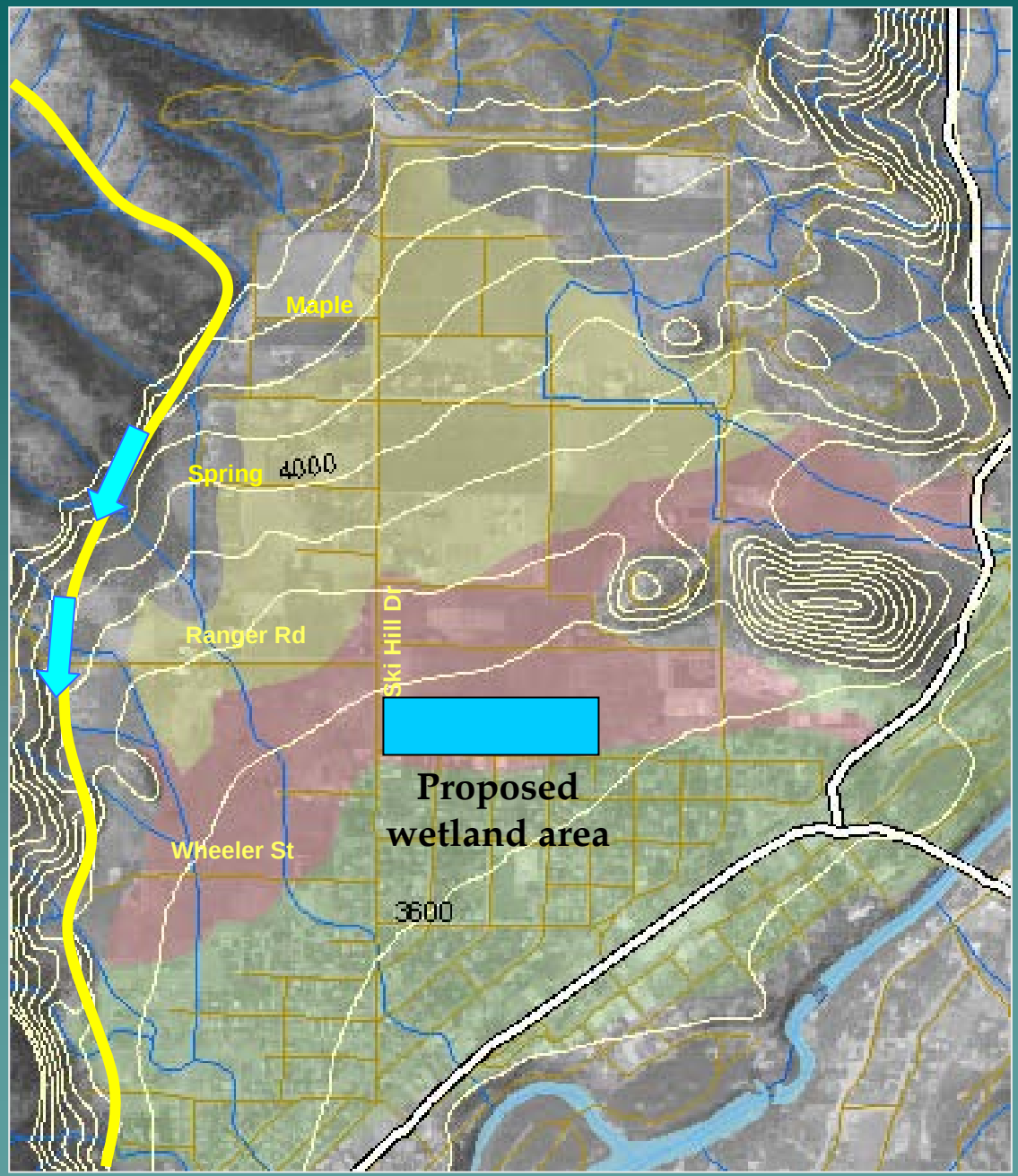
General Location of Moraines



Older Alluvium – ditches here causes flooding downslope

Hydric soils – wetland type area

Till – sheet flow and flooding because of upslope ditches



Green infrastructure allows the natural setting function to solve problems